



Readers absorb less on Kindles than on paper, study finds

Research suggests that recall of plot after using an e-reader is poorer than with traditional books



A new study has found that readers using a Kindle (a popular e-book reader) were "significantly" worse than paperback readers at recalling when events occurred in a mystery story. The study is part of major new Europe-wide research looking at the impact of digitization on the reading experience.

The study, presented in Italy at a conference last month and set to be published as a paper, gave 50 readers the same short story by Elizabeth George to read. Half read the 28-page story on a Kindle, and half in a paperback, with readers then tested on aspects of the story including objects, characters and settings.

Anne Mangen of Norway's Stavanger University, a lead researcher on the study, thought the e-readers might have a difference in the emotional response to the story. Her predictions were based on an earlier study comparing reading an upsetting short story on paper and on iPad.

Instead, the most notable differences appeared when it came to the timing of events in the story. "The Kindle readers performed significantly worse on the plot reconstruction measure, such as when they were asked to place 14 events in the correct order."

The researchers suggest that "the digital and tactile feedback of a Kindle does not provide the same support for mental reconstruction of a story as a print pocket book does".

"When you read on paper you can sense with your fingers a pile of pages on the left growing, and shrinking on the right," said Mangen. "You have the sense of progress, in addition to the visual ... Perhaps this somehow aids the reader, providing more fixity and solidity to the reader's sense of the unfolding of the story."

Mangen also pointed to a paper published last year, which gave 72 Norwegian 10th-graders texts to read in print, or in PDF on a computer screen, followed by comprehension tests. She and her fellow researchers found that "students who read texts in print scored significantly better on the reading comprehension test than students who read the texts digitally".

She is now chairing a new European research network doing empirical research on the effects of digitization on text reading. The network says that "research shows that the amount of time spent reading long-form texts is in decline, and due to digitization, reading is becoming more intermittent and fragmented." This may result in a negative impact on the cognitive and emotional aspects of reading.

"We need to provide research and evidence-based knowledge to publishers on what kind of devices (iPad, Kindle, print) should be used for what kind of content; what kinds of texts are likely to be less hampered by being read digitally, and which might require the support of paper," said Mangen. "I'm thinking it might make a difference if a novel is a light read, when you don't necessarily have to pay attention to every word, compared to a 500-page, complex literary novel like *Ulysses*. That will be very interesting to explore."

The Elizabeth George study included only two experienced Kindle users, and she is keen to replicate it using a greater proportion of Kindle regulars. But she warned against assuming that the "digital natives" of today would perform better. "I don't think we should assume it is all to do with habits, and base decisions to replace print textbooks with iPads, for instance, on such assumptions. Studies with students, for instance, have shown that they often prefer to read on paper," she said.